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~~C O N F I D E N T I A L NOFORN~~
COMPLET 001 OF 002
SERIAL: (U) IIR (b)(2),(b)(3):10 USC 424
EZ2:
PASS: (U) (b)(2),(b)(3):10 USC 424
COUNTRY: (U) JAPAN (JA); SOUTH KOREA (KS); TAIWAN (TW); THAILAND (TH).
SUBJ: IIR (b)(2),(b)(3):10 USC 424 /SOUTHEAST ASIAN RESEARCH INVOLVING KNOWN BIOLOGICAL W/ FARE CAPABLE MARINE TOXINS (U)
WARNING: (U) THIS IS AN INFORMATION REPORT, NOT FINALLY EVALUATED INTELLIGENCE. REPORT CLASSIFIED ~~C O N F I D E N T I A L NOFORN.~~

DEPARTMENT OF DEFENSE

DOI: (U) 890000
(b)(2)

SUMMARY: (C) LETHAL MARINE TOXIN RESEARCH INVOLVING LIVE MARINE SPECIMENS FROM SOUTHEAST ASIA HAVE BEEN AN ONGOING JOINT EFFORT OF JAPANESE/THAI/TAIWAN/REPUBLIC OF KOREA RESEARCHERS. DETAILED ARE THE RESULTS OF THEIR RESEARCH. ENCLOSURES.
TEXT: (C) THIS REPORT DISCUSSES THE RESULTS OF LETHAL MARINE TOXIN RESEARCH INVOLVING LIVE MARINE SPECIMENS FROM SOUTHEAST ASIA. ALL SPECIMENS WERE COLLECTED DURING 1986 AND SHIPPED TO JAPAN FOR TOXICITY ANALYSIS. AT THE JAPANESE LABORATORIES, THAI, TAIWAN AND REPUBLIC OF KOREA (ROK) RESEARCHERS CONTRIBUTED TO THE STUDY AND EVALUATION OF TOXICITY LEVELS FOUND IN LIVE MARINE SPECIMENS.
A. ~~(C)~~ (b)(6) (b)(2) LEAD THE RESEARCH TEAM IN ISOLATING 16 OF 22 STRAINS OF TETRODOTOXIN (TTX) FROM PHILIPPINE AN9 JAPANESE BLUE-RINGED OCTOPUS, OCTOPUS MACULOSUS. THE RESULTS OF HIS RESEARCH (ENCLOSURE 1 - TO FOLLOW) SHOWED THAT SIX STRAINS CLEARLY EXHIBITED TTX PRODUCTIVITY.
B. ~~(C)~~ ROK, TAIWAN AND JAPANESE RESEARCHERS INVESTIGATED CASES OF PARALYTIC SHELLFISH POISONING (PSP) IN TAIWAN AND THE ROK (ENCLOSURE 2 - TO FOLLOW). SHORTLY AFTER A FOOD POISONING INCIDENT IN PUSAN, ROK IN APRIL 1986, SAMPLE MUSSELS (MYTILUS EDULIS) WERE

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COLLECTED AND TESTED. THE MUSSEL DIGESTIVE GLANDS REGISTERED PSP AT A LETHAL POTENCY OF 490 MOUSE UNITS PER GRAM (MU/G). ANALYSES REVEALED CONCENTRATIONS OF PROTOGONYAUTOXINS, GONYAUTOXINS AND SAXITOXINS AT A RATIO OF 2 TO 84 TO 14. BY THEIR ESTIMATES, MORTAL LETHAL DOSAGE FOR A 60-KILO MAN WAS 3,000 MU, ABOUT SIX GRAMS OF THE SUSPECT MUSSEL. SAMPLES DRAWN IN MAY FROM THE SAME REGION WERE USED EXCLUSIVELY FOR A LETHAL POTENCY ASSAY.
C. ~~(C)~~ ROK, TAIWAN AND JAPANESE RESEARCHERS ANALYZED CULTURED PURPLE CLAMS (SOLETELLINA DIPHOS) FROM A TAIWAN POND FOLLOWING A POISONING INCIDENT IN JANUARY 1986 (ENCLOSURE 3 - TO FOLLOW). CLAM DIGESTIVE GLAND SPECIMENS REGISTERED THE HIGHEST POTENCY OF 2,000 MU/G FOLLOWED BY OTHER PARTS AT 160 MU/G. HIGH-PERFOPMANCE LIQUID CHROMATOGRAPHY (HPLC) ANALYSES DETERMINED THE RESPONSIBLE TOXIN TO BE GONYAUTOXINS 1-4 (GTX SUBSCRIPT ONE THROUGH FOUR), ALONG WITH SOME SAXITOXIN (STX) AND NEOSAXITOXIN. THE POTENCY OF THE CLAM DECREASED TO 6 MU/G IN DECEMBER 1986. SUBSEQUENT SURVEILLANCE OF THE TOXIC PURPLE CLAMS AT MARKET FOUND A POTENCY OF 15 MU/G IN THE EDIBLE PARTS.
D. ~~(C)~~ A JOINT THAI-JAPANESE RESEARCH TEAM ATTEMPTED TO DETECT TTX PRODUCING BACTERIA IN THE THAI HORSESHOE CRAB (CARCINOSCORPIUS ROTUNDICAUDA), A TTX CONTAINING MARINE INVERTEBRATE (ENCLOSURE 4 - TO FOLLOW). TWO SPECIMENS OF C. ROTUNDICAUDA, ONE MALE AND ONE FEMALE, WERE COLLECTED FROM THE GULF OF THAILAND IN APRIL 1986 AND SHIPPED LIVE TO TOKYO, JAPAN. THIRTEEN DOMINANT BACTERIA OF 58 STRAINS FROM THE GASTROINTESTINAL TRACTS OF THE HORSESHOE CRAB WERE ISOLATED AND CULTURED. ALL 13 STRAINS PRODUCED ANH-TTX. ONE STRAIN, IDENTIFIED AS VIBRIO ALGINOLYTICUS, PRODUCED BOTH TTX AND ANH-TTX.
COMMENTS: 1. ~~(C/NF)~~ (b)(2) - ALL TOXINS MENTIONED IN THIS REPORT ARE KNOWN, OR SUSPECTED, BIOLOGICAL WARFARE (BW) AGENTS USED, OR BEING DEVELOPED, BY THE SOVIET UNION, WARSAW PACT, IRAQ AND SYRIA. (b)(1)

2. ~~(C/NF)~~ (b)(1) - FOR ALMOST FIVE YEARS, RESEARCHERS HAVE BEEN TRYING TO CULTIVATE TTX-PRODUCING STRAINS UNDER CULTURE CONDITIONS WITH LIMITED SUCCESS. NEARLY 50 PERCENT OF THE CULTURES EXHIBIT LETHAL TOXICITY, WHILE THE OTHER HALF PRODUCE NO TOXICITY. RESEARCHERS HAVE NOT YET BEEN ABLE TO SYNTHESIZE TTX PRODUCTION WITH A HIGHER DEGREE OF RELIABILITY. RESEARCHERS ARE UNABLE TO EXPLAIN THE TTX TOXICITY-NONTOXICITY INCONSISTENCY (SIC).
3. ~~(C/NF)~~ (b)(1) - TO DETERMINE THE ACCUMULATIVE CAPACITY OF ANOTHER MARINE INVERTEBRATE, JAPANESE RESEARCHERS ADMINISTERED TTX INTRAPERITONEALLY INTO TRUMPET SHELL (CHARONIA SAULIAE) SPECIMENS. BEFORE ADMINISTRATION OF THE TOXINS, THE TRUMPET SHELLS WERE SUBJECTED TO STIMULI TO TEST REACTIONS. FOLLOWING ADMINISTRATION OF TTX TOXINS, UP TO 100 TIMES HUMAN MORTAL LETHAL DOSE, THE TRUMPET SHELLS IMMEDIATELY BECAME EXCITED AND MOVED ABOUT SPASMODICALLY; HOWEVER, THEY DID NOT RESPOND TO EXTERNAL STIMULI AS BEFORE. RESEARCHERS ESTIMATED THAT THE SODIUM CHANNEL BLOCKING PROPERTIES OF TTX ANESTHETIZED THE TRUMPET SHELL TO THE EXTERNAL STIMULI (SIC).
4. ~~(C/NF)~~ (b)(1) - RESEARCHERS HAVE PRODUCED TTX IN CRYSTALLINE FORM. USING SAMPLES LEFT OVER FROM PREVIOUS STUDIES SUCH AS THE KOREAN MUSSELS OF APRIL AND MAY 1986, RESEARCHERS PURIFIED THE EXTRACTS OF DIGESTIVE GLANDS BY DEFATTING AND ULTRAFILTRATION. AFTER CHROMATOGRAPHICATION, TOXIC FRACTIONS WERE COMBINED AND FREEZE-DRIED. ABOUT 5 GRAMS OF BASE MATERIAL MADE 1 MILLIGRAM OF TTX OVER A 30-DAY PERIOD (SIC).
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<<<<< SECTION 2 >>>>>
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(b)(2)
ENCL: (U) TO FOLLOW - 4 ENCLOSURES.
1. DOCUMENT - "TETRODOTOXIN-PRODUCING BACTERIA FROM THE BLUE-RINGED OCTOPUS, OCTOPUS MACULOSUS" (U), 1 COPY, 881001, 6 PAGES (U).
2. DOCUMENT - "PARALYTIC SHELLFISH POISONING BY THE MUSSEL MYTILUS EDULIS IN KOREA" (U), 1 COPY, 890000, 4 PAGES (U).
3. DOCUMENT - "PARALYTIC SHELLFISH POISONING IN TAIWAN" (U), 1 COPY, 890000, 4 PAGES (U).
4. DOCUMENT - "TETRODOTOXIN-PRODUCING BACTERIA FROM THE HORSESHOE CRAB, CARCINOSCORPIUS ROTUNDICAUDA" (U), 1 COPY, 880129, 4 PAGES (U).
(b)(2),(b)(3):10 USC 424

WARNING: (U) REPORT CLASSIFIED ~~C O N F I D E N T I A L NOT RELEASABLE TO FOREIGN NATIONALS.~~
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